

# Extraction of Metals by Mercaptans Attached to Silica Gel by Azeotropic Distillation

## Abstract

The present invention attaches a molecule that contains a hydroxyl group (OH) attached to a carbon chain which is attached to a coordinating atom or atoms, the acidity of which is greater than that of silica (i.e.,  $pK_A < 10$ ). The condensation is achieved by mixing silica gel, appropriate amount of ligand, and a drop of conc. sulfuric acid in toluene in a flask attached to a Dean-Stark tube. Heating of the mixture is continued until the amount of water, obtained by azeotropic distillation and condensation, reaches a constant value. Toluene is filtered off, and recycled. The supported ligand is dried under reduced pressure to remove residual toluene. The composite (ligand attached to silica) can then be used by batch or column method to remove heavy metal ions from aqueous solution.